Science Advisory Committee Meeting – 10 January 2002

National Capital Network - Park Summaries

The Network includes eleven National Park units with significant natural resources. The parks range in size from 53 to 7,788 hectares (ha) and encompass the Ridge and Valley, Blue Ridge, Piedmont, and Coastal Plain physiographic provinces. All parks in the Network have active relationships with local entities including other state and federal government agencies, educational and non-profit institutions, municipalities, and the general public. Park summaries are based on reviews of Resource Management Plans (RMP), Project Management Information System (PMIS), Investigator Annual Report (IAR) and interviews with Park Superintendents and Resource Management staff.

Park <<click to link to summary>>	Park code	Size (acres)	Size (ha)	Physiographic province
Antietam National Battlefield	ANTI	3,255	1,318	Ridge and valley
Catoctin Mountain Park	CATO	5,770	2,336	Ridge and valley
Chesapeake and Ohio Canal National Historical Park	CHOH	19,236	7,788	Coastal plain, Piedmont, Blue ridge, Ridge and valley
George Washington Memorial Parkway	GWMP	7,899	3,198	Coastal plain, Piedmont
Harpers Ferry National Historical Park	HAFE	2,287	926	Ridge and valley
Manassas National Battlefield Park	MANA	5,098	2,064	Piedmont
Monocacy National Battlefield	MONO	1,647	667	Piedmont
National Capital Parks – East	NACE	10,814	4,378	Coastal plain, Piedmont
Prince William Forest Park	PRWI	18,569	7,518	Coastal plain, Piedmont
Rock Creek Park	ROCR	2,717	1,100	Coastal plain, Piedmont
Wolf Trap Farm Park	WOTR	131	53	Piedmont
Total		**77,425**	**31,346**	

Antietam National Battlefield Summary

Overview

Antietam National Battlefield is managed within the historical context of General Robert E. Lee's first invasion of the North in September 1862 during the Civil War. The battle claimed more than 23,000 men (killed, wounded, and missing) in one single day, September 17,1862, and led to Lincoln's issuance of the Emancipation Proclamation. The 1,318 ha park is located in the heart of Maryland surrounded by rolling hills dotted with farm fields and pastures reminiscent of the day of the battle.

Patches of forests, open meadows, and croplands are found within the park. Significant natural resources include sensitive habitats along Antietam Creek, unique limestone upland forests (Snavely Woods), and three state rare, threatened, and endangered species, including the loggerhead shrike (*Lanius ludovicianus*), goldenseal (*Hydrastis canadensis*), and the butternut (*Juglans cinerea*). Possible white-tailed deer (*Odocoileus virginianus*) overabundance and the presence of the gypsy moth (*Lymantria dispar*) and woolly adelgid (*Adelges tsugae*) are management concerns.

Park Resources and Species of Concern

Most Valuable Resources:

1. Landscape that is composed of cultural and natural resources. The General Management Plan calls for maintaining the 1860 landscape, which includes the forest, orchard, and agricultural setting. Current crops grown include: Corn, Soybeans, Wheat, Barley, Oats, Hay Crops including alfalfa, clover, timothy, and orchard grass
2. Historical Trees.
3. Aquatic resources including Antietam Creek and tributaries, spring heads, wetlands.
4. Beech/Tulip Poplar and Oak/Hickory in the Snavely Woods.
5. Karst landscape of groundwater systems, riparian areas, creeks (Antietam Creek), springs, tributaries (Sharpsburg Creek, Mumma Run), and wetlands.
8. Vegetation Communities: Beech/Tulip Poplar forest

Species of concern have been identified and include species that are overabundant or invasive, as well as rare/threatened/endangered species. 23 species of concern for Antietam National Battlefield were identified in the following taxonomic groups: birds (8), mammals (1), fish (1), invertebrates (4), vegetation (8), and vegetation communities (1). This subject will be discussed by workgroup(s) in greater detail at a later date.

Threats and Resource Management Issues

Threats:

1. Exotic vegetation (Especially ailanthus, garlic mustard, multiflora rose, Japanese barberry, tartarian honeysuckle, Japanese honeysuckle).
2. White-tailed deer overabundance. The current population density estimate for fall 2000/spring2001 = 66.95 / sq. mile; 90% CI: 59-76/sq. mile.
3. Agricultural runoff. This may be a problem to both surface waters and groundwater.
4. Pollution to Antietam Creek (industrial, sewage, street and commercial runoff).

Threat Abatement:

1. Easements (for example, to keep land in agricultural use)
2. Spring protection (buffering, establishing no-chemical zones, education of farmers and employees).
3. Restoration of native grasses and Oak / Hickory forest.
4. Tree Preservation (Burnside Sycamore).
5. Exotic plant control of ailanthus and honeysuckle. Some exotics like Garlic mustard are a bigger problem but there is no treatment available yet. The park also monitors and keeps track of treatments and their effectiveness. The focus has been on roads, fencerows and reforestation of treated areas.
6. Pest control (crop pests, hemlock wooly adelgid, Anthracnose, and Japanese beetles are being treated.
7. Nutrient management plans and use of BMPs are integrated into all agricultural operations.

Resource Management Issues:

The overall goal of the park is to maintain the general landscape as it was during the Civil War including natural and cultural resources.

1. More funding and equipment are necessary.
2. Deer abundance
3. Up-to-date resource management plan needed for newly acquired lands.

Summary of Existing Monitoring Programs and Needs

Air: An ozone monitoring program was completed during the summers of 1984, 85, and 86. The program was organized by the Air Quality Division, WASO and monitored ozone damage on milkweed plants.

Amphibian: None

Birds: Mark Raabe of NA Bluebird Society monitors nest boxes annually. ANTI gets a paper report every year.

Fire: There is a fire weather monitoring station at C & O Canal, Sharpstown headquarters. In addition, Don Bouche (NPS - FMO) and Alan Biller (NPS) are working on fire management plans for the parks. They are incorporating air quality and smoke monitoring needs. This wildland management plan covers prescribed fire and research

burns. They plan to do a literature search on fire effects on eastern species. In addition, they plan to do research burns next spring. There will be a monitoring component of the fire plan.

Fish: None

Geology: None

Mammals: Deer Distance Sampling started in FY2001 and is planned twice a year in spring and fall. In addition, transects are run through the park to count deer (and all other mammals) in areas not covered by distance sampling. Roadkill data are collected in the Park Oct. – March. Woodchuck monitoring is limited to identifying structural damage to historic buildings and the cemeteries.

Meteorology: The Park records rainfall in Hagerstown where there is an official NOAA station.

Pests: Structural pests, Woolly Adelgid, West Nile Virus and Gypsy Moths (NPS and USDA).

Pesticides use: Pesticide logbook on file.

Reptiles: None

Soils: None

Sound: None

Vegetation:

Exotics - the park looks for new species. Invasive species are mapped by Exotic Plant Management Team.

Historical trees – the park started a project few years ago to collect seeds from historical tree species. A SCA Volunteer implemented the project but it is not complete. The volunteer was also tagging trees as part of the Historical and Commemorative Areas monitoring.

Wildflowers – an informal survey resulted in a brochure. There is no systematic monitoring.

Goldenseal – visually surveyed but there is no systematic monitoring.

Crops - farmers collect yield data as an indicator of health. In addition, farmers report soil fertility including soil nutrients.

Snavely Woods - 6 20 x 20 m long-term vegetation plots have been set up in 1998.

Visitors: None

Visual Landscape: photomonitoring (past)

Water Quality:

USGS Water Resources Division in cooperation with states monitors the discharge of the Antietam Creek near Burnside Bridge (August 1928 – Present). From June 1897 to September 1905, discharge was measured about 1/2 mile upstream near "Middle Bridge".

An actively maintained USGS gauging station is located downstream of Burnside Bridge. This is Station # 01619500. Records are confusing; however, hard copy files indicate that various bureaus within the MD DNR monitored bacteriological levels and other parameters from 1986-1995. The data is included in the NPS Water Resources Division publication of water data for ANTI.

USGS Water Resources Division in cooperation with MD DNR – MD Geological Survey monitors discharge at the Mumma Spring. This was done in May 1969, April 1987, and January 1991 - Present. This is Spring # WA Di 103. Hard copy files indicate that MD DNR - MD Geological Survey monitored biological and chemical parameters periodically from 1990 until the present.

In 1997, 6 sites were established by NPS ANTI to monitor DO, nitrates and phosphates to look at run-off from agricultural fields. In addition, they are looking for herbicide contamination to see how well forest buffers are working.

A water quality education project ("Water Watchers") for high school collects some water quality data. The project was started in 1995.

The NPS Water Resources Division will be completing a scoping report for ANTI in 2001/2002.

Most Important Monitoring Needs:

1. Additional exotic plant monitoring needed (Japanese barberry, garlic mustard, honeysuckle sp.)
2. White-tailed Deer*
3. Ground and Surface Water Quality and their impacts on Agricultural Landscape (limited ongoing)
4. Forest Health
5. Monitoring of aquatic biota is needed (macroinvertebrates, fish, mussels)
6. Basic weather monitoring
7. Surveys for Amphipods are needed
8. Species of Concern
9. Fire monitoring

10. Wildlife habitat evaluation

*Indicates already implemented

Current Research Projects and Needs

Existing Research Projects:
Alison Dibble of USDA Forest Service is developing a model to predict where invasive species may colonize.

Research Needs:
1. Map groundwater sinkholes, subsurface Karst resources.
2. How can fire be used to manage exotic species?

Partnering and Neighboring Agencies and Individuals

Partnering Agencies/Individuals:
1. Maryland Department of Environmental (Water Quality)
2. Maryland Department of Natural Resources (works with ANTI on exotics control; Don Warback has been in contact with ANTI on managing warm season grasses and fire).
3. Washington County Cooperative Extension Service (Crop management)

Neighboring Land Management Agencies:
1. South Mountain State Park. This is a new park that is part of South Mountain Recreation Area.
2. Indian Springs Wildlife Management Areas
3. Greenridge State Forest.
4. Gaflin State Park
4. 4 county parks in Sharpsburg
5. Washington Monument State Park

Catoctin Mountain Park Summary

Overview

Catoctin Mountain Park originated as a Recreation Demonstration Area (RDA) under the National Industrial Recovery Act of 1933. Catoctin was transferred to the National Park Service in 1936 and has remained under its jurisdiction due to the historical events of national and international interest associated with the Presidential Retreat, Camp David, contained within. Although the area is managed by the National Park Service for its recreational use and the conservation of it cultural and natural resources, existing enabling legislation does not provide clear and concise management goals.

The park encompasses 2,336 ha of forested landscape located in the mountains of the Catoctin Ridge in the north-central portion of Maryland. Unique geological formations consisting of metamorphic sandstones and greenish-gray metabasalts forming cliffs occur in the park. Several overlooks illustrate the forces of volcanism, folding, faulting, and weathering. Catoctin has a maturing forest of chestnut oak (*Quercus prinus*), hickories (*Carya* spp.), and maples (*Acer* spp.) and over 650 species of vascular plants. It has two diverse aquatic streams crossing the park.

Management issues include the effects of white-tailed deer overpopulation, exotic invasive plants, gypsy moth (*Lymantria dispar*), hemlock woolly adelgid (*Adelges tsugae*), and Dogwood anthracnose. Forest health and structure are being affected by these threats. Numerous plant species have already become extirpated or run the risk of being eliminated from the park's plant community. Also, water quality degradation is a concern as residential and agricultural activity increase along the park's 35 km of boundary.

Park Resources and Species of Concern

Most Valuable Resources:

1. Streams and Water Quality.
2. Landscape (Mountain Forest).
3. Forest/streams/seeps and wetlands/rare plants in the seeps and wetlands.
4. Greenstone glade, Owens Creek Swamp
5. Biologically diverse steep tallus slope on the northeast side of park.
6. Species of Concern including T & E Species and state listed species.
7. Air Quality/Visibility/Vistas
8. Cultural Resources – Historic Cabins and Landscapes

Species of concern have been identified and include species that are overabundant or invasive, as well as rare/threatened/endangered species. 48 species of concern for Catoctin Mountain Park were identified in the following taxonomic groups: birds (15),

mammals (3), herps (1), fish (1), invertebrates (3), vegetation (24), and vegetation communities (1). This subject will be discussed in greater detail by workgroup(s) at a later date.

Threats and Resource Management Issues

Threatened Resources:
1. Lack of tree regeneration
2. Hemlocks threatened because of Adelgid. No replanting planned.
3. Dogwood most threatened. 85% of dogwoods were lost in the mid 1980s.
4. Timber Rattlesnakes.
5. Air Quality, possibly. Potential future threat more than a current threat.
6. Ginseng appears to have decreased in recent years.

Threats:
1. Alien Species (Wooly Adelgid, Gypsy Moth, and plants)
2. White-tailed Deer browse
3. Sedimentation and Water Quality
4. Few people on Natural Resource Management staff
5. Snake Collectors
6. Development outside of park and inside (eg cell towers)

Threat Abatement:
1. Control for exotic plants ongoing.
2. Dogwood reforestation ongoing.
3. Stream improvements along Hunting Creek for trout (Wild Brook and Brown)
4. Fish Management - Catch and return only. State is restocking fish inside and outside or the park.
5. Controlling Gypsy moths.
6. Treated Adelgid at Round Meadows.
7. NPS monitors the water quality to adjust the release from the state park's lake.
8. Purple-fringed Orchid and landscaping trees are being caged to prevent deer predation.
9. EIS for deer management is planned.

Resource Management Issues:
1. Update and re-evaluation of management plans for deer, fire, and trout are needed.
2. Park wide survey for exotic plants is needed.
3. Outside park boundary concerns
4. Air Quality may be a concern

Summary of Existing Monitoring Programs and Needs

Air: (1) Ozone – During 1992 and 1993. (2) Visibility - In 1986.

Amphibians: North American Amphibian Monitoring Program (NAAMP) conducted by Wayne Hildebrand (graduate student, Hood College) in 2001.

Birds: Christmas Bird Count (CBC). Park data available for 2000.

Fire: None

Fish: (1) Trout population survey by CATO and MD DNR (1978 – present). (2) NPS monitors a few higher tributaries to evaluate effectiveness of stream improvements. Data goes back to 1980s. (3) Trout Fry Survey: Done by CATO, started about mid 1980s. Data available in spreadsheet format.

Geology: None

Mammals: (1) Deer – Distance Sampling has been implemented in 2000. (2) Informal Deer Mortality Survey by CATO.

Meteorology: The park is an official reporting station for NOAA (1966- present)

Pests: (1) Wooly Adelgid/Hemlock – Intermittent data from 1994 – present. (2) West Nile Virus – Monitored in 2001 as part of regional monitoring effort. (3) Gypsy Moth – overflights and egg mass surveys conducted annually. (4) Dogwood anthracnose – informal windshield survey along the central road. (5) Termites.

Pesticide Use: Log on file.

Reptiles: Timber Rattlesnake den checks conducted every two years since 1981.

Soils: None

Sound: None

Vegetation Monitoring: (1) Vegetation Plots – (1990-1992). Modified in 2000 to measure regeneration. (2) Rare Plants - Informal surveys. (3) Exotic Plants – Monitor treatment. Post treatment is not monitored. (4) Flowering Dogwood - Informal surveys, reforested trees are tagged and checked each May.

Visitors: None

Visual Landscape: None

Water Quality: (1) Gauging station on Monocacy River. (2) State park has a flow gauge below lake. (3) U.S. Geological Survey monitors surface waters. (4) Monitoring planned at Owens Creek. (5) Macroinvertebrates sampling at Big Hunting Creek and Owens Creek by MD DNR since about 1980. (6) Stream Habitat Assessment - CATO used EPA protocol for a stream habitat assessment; done twice in 1990s.

Most Important Monitoring Needs:
1. Air Quality/Vista
2. Neotropical Migrants
3. Global Warming maybe
4. The park has little baseline data on heavy metals and no pesticide information for surface waters.
5. Herps.
6. Invertebrates (not just macros).
7. Fungi…especially morels which are heavily harvested here.
8. Alien species including gypsy moths, wooly adelgid, and alien plants.
9. Timber Rattlesnake appears to be declining; data collected in the park is not shared with the park.
10. Bats

Regional Monitoring: State tracks hunting permits and number of deer shot in the region and monitors crop damage.

Current Research Projects and Needs

Existing Research Projects: None

Research Needs:
1. Fire History
2. Prescribed Fire to evaluate impacts on vegetation.

Partnering and Neighboring Agencies and Individuals

Partnering Agencies/Individuals: None

Neighboring Land Management Agencies:
Gambrill State Park

Chesapeake and Ohio Canal National Historical Park

Overview

The **Chesapeake and Ohio Canal National Historical Park** stretches along the Potomac River for 297 km (184.5 miles) from Washington, D.C. to Cumberland, MD making it unique in the National Capital Region as the largest and longest. The park's 7,788 ha cut through four geographic provinces and include riparian and upland habitat. From beginning of construction in 1828 to the end of operation in 1924, the canal functioned as a transportation route, primarily hauling coal from western Maryland to the port of Georgetown in Washington, D.C. In 1938, the Federal government acquired defunct C& O Canal Company property, focusing on the lower 23 miles of the canal for restoration. In 1971, legislation authorized the National Park Service to preserve and interpret the park's historic and scenic features and designated Chesapeake and Ohio Canal as a National Historical Park. Hundreds of original structures, including 74 lift locks, lock houses, and aqueducts, serve as reminders of the canal's role as a transportation system during the Canal Era. The park also supports a great variety of recreational opportunities from the highly urbanized area in Washington, DC to more the rural communities in western Maryland serving 3.1 million visitors in 2000.

As of 2001, at least 243 rare species occur in the park, including 9 wildlife species and over 100 plant species. Harperella (*Ptilimnium nodosum*), a federally endangered vascular plant, is found in the park. The main management concerns focus on the rapid spread of exotic and weedy species invading natural areas along the canal.

Park Resources and Species of Concern

Most Valuable Resources:

1. Over 100 State/Federally listed rare, threatened and endangered species
2. Over 23 identified significant rare plant habitats, such as nationally significant bedrock terrace habitat, and 86 individual rare plant sites documented.
3. Water resources in and adjacent to the park (Potomac River) (Note: The Potomac itself is not in the park and falls under the jurisdiction of the state of Maryland. The CHOH boundary only goes to the high water line).
4. Geologic resources
5. Potomac Gorge, one of the most significant natural areas in the National Park system, including noteworthy stands of upland forest, numerous seeps and springs, wetlands, and over 400 occurrences of 200 rare species and communities
6. Park provides riparian zone protection to Potomac River while development increases on the park boundary and on the other side of river.

7. Recreational values and opportunities that are increasing in importance as human population increases (does not include recreation on the Potomac but does include access to the Potomac River).
8. High quality viewsheds

Species of concern have been identified and include species that are overabundant/invasive, as well as rare/threatened/endangered. 125 species of concern for Chesapeake and Ohio Canal National Historical Park were identified in the following taxonomic groups: birds (13), mammals (3), herps (1), invertebrates (3), vegetation (82), and vegetation communities (23). This subject will be discussed in greater detail by the workgroup(s) at a later date.

Threats and Resource Management Issues

Threats:

1. Floods – an all-encompassing threat to park natural, cultural and recreational resources, to park operations and budget for extended periods of time (last 2 major floods occurred in 1996).
2. Exotic plants - 68 identified as important invasive species.
3. Population growth/adjacent development (roads, fragmentation), and internal and adjacent land use.
4. Rights-of-way/Utility crossings (internal, external)
5. Potomac Interceptor sewer line, power plants, telecommunication sitings
6. Deer over browsing.
7. Runoff of pollutants, sedimentation.
8. Concentrated visitor use areas – official and social trails, climbing, fishing, etc.
9. Opposing values (i.e. cultural vs. natural resources) such as the historic leasing program that may issue an historic lease to provide an avenue for restoration of an historic building that may propose removing surrounding natural resources or planting exotics.

Threat Abatement:

1. Exotic Plant Management Team is focusing control efforts on the Potomac Gorge.
2. The CHOH has a number of scenic easements although these could be rewritten to be more resource protective.

Resource Management Issues:

1. People and/or dollars in the park to plan and conduct monitoring, manage and analyze data, provide information to park management.
2. People and/or dollars in the park to evaluate NEPA related issues and produce NEPA related documents for internal and external projects/impacts.
3. Exotics – mapping and treatment of exotic plants; study/monitor/address exotic plant impacts to important rare plant communities.
4. Rare, threatened, and endangered habitats (species). Need to identify threats; develop and implement monitoring scheme; implement actions to minimize threats.

5. Water quality (surface and subsurface). Need to develop and implement monitoring program; identify and implement protection/restoration actions. (Subsurface gets at drinking water wells and important springs/caves that support rare aquatic invertebrates.)
6. Deer – study/monitor/address deer damage to important rare plant communities and agricultural crops/lands.
7. Also issues related to servicing 3.5 million users and how to maintain resources under these conditions.
8. Boundaries. Although the canal and towpath length is 184.5 miles long, the park manages over 350-400 miles total of boundaries.
9. Cell Tower issues. CHOH needs information on the impacts of Cell Towers.
10. Need to digitize existing data on springs and their locations.
11. Determine if and where historic and non-historic culverts impact fish migrations, and how to fix culverts to mitigate their effects where impacts exist.

Summary of Existing Monitoring Programs and Needs:

Air: None

Amphibian: Dr. Ed Thompson is in the process of developing amphibian monitoring protocols for Washington and Allegany Counties. Final Report is due in December 2001.

Birds: CHOH established a breeding bird count along length of canal – count conducted every 3 years; DC Audubon coordinates annual mid-winter bird count along the length of the canal.

Fire: None

Fish: None

Geology: None

Mammals: Distance Sampling is being employed to monitor deer populations. The regional Wildlife Biologist coordinates effort.

Meteorology: Weather station, installed in 1994, is monitored daily by Branch of Visitor and Resource Protection at park headquarters. Data is stored and analyzed in WIMS (Weather Information Management System).

Pests: Regional IPM coordinator and USDA monitor Gypsy Moths; West Nile Virus was monitored in 2000 as part of a regional monitoring program; the park surveys Hemlock Wooly Adelgid annually.

Pesticides use: Logbook is on file.

Reptiles: None

Soils: Farmers are supposed to monitor soils but most are not doing this well.

Sound: None

Vegetation: Maryland Heritage has surveyed CHOH for rare plants but a systematic monitoring program has not been established. On-going exotic vegetation program includes EPMT control and monitoring in the Potomac Gorge, and several park-managed projects.

Visitors: None

Visual Landscape: None

Water Quality: Stream Water – The Potomac is managed and monitored by MD and other entities; monitoring water quality of the Potomac River is not a priority nor responsibility for the park. The park monitors drinking water wells and NCR monitors groundwater contamination sites.

Most Important Monitoring Needs:
1. Identify vital signs and protocols
2. Monitor flood impacts on resources, long-term
3. Water quality (surface and subsurface)
4. Rare, threatened and endangered species/habitats, long-term
5. Deer impacts to native plants and to crops
6. Visitor use impacts to natural and cultural resources, site specific
7. Exotic weed impacts on native plants
8. Monitor human impacts at camping and climbing areas (especially in POGO).
9. Monitor invasion of Asiatic clam and develop action plan.
10. Rare groundwater invertebrates found in park springs and caves.

Current Research Projects and Needs

Existing Research Projects: None

Research Needs:
List of projects currently in PMIS (not prioritized):
1. Evaluate and identify exotic plants impacting rare plant sites.
2. Map and quantify water subterranean recharge zones $80K
3. Research forest ecology- floodplain forest $100K
4. Monitor beaver populations and mitigate impacts $10K
5. Inventory exotic plant invasions $82K
6. Exotic plant species management plan $72K
7. Wetland delineation $80K

8. Contemporary vegetation map $200K
9. Evaluate impacts of white-tailed deer on resources $100K
10. Implement best management practices, agricultural lands $4.2K
11. Study habitat selection and nesting success of Cerulean Warbler $166.8K
12. Document changes in land use/land cover on Cerulean Warbler $200K
13. Hire seasonal staff to develop GIS data layers for I&M $6.5K

Partnering and Neighboring Agencies and Individuals

Partnering Agencies/Individuals: None

Neighboring Land Management Agencies:

1. Fort Frederick State Park
2. Sideling Hill WMA (3,000 acres, Western part of state) - There is harperella in this area.
3. Green Ridge State Forest (44,000 acres, Western part of state; CHOH is very narrow at this point and acts as a buffer to the State Forest)
4. Seneca Creek State Park (7,000 acres, Montgomery County)
5. McKee-Beeshers Wildlife Management Area.
6. Dickerson Conservation Area
7. Blockhouse Point Park

George Washington Memorial Parkway

Overview

George Washington Memorial Parkway was developed in 1932 as a memorial to George Washington and to protect the scenic view along the Potomac River shoreline and its tributaries in the D.C. area between Mt. Vernon and Great Falls. The park's 3,198 ha offer opportunities to travel to historical, natural, and recreational areas located within the park. In addition, the park provides refuge for native species in close proximity to a large urban population that can witness the natural relationships and beauty within a short walk. In the parks enabling legislation, the parkway is broadly mandated "…to prevent pollution of Rock Creek, and the Potomac and Anacostia Rivers, to preserve forests and natural scenery in and about Washington." The mandate also mentions the protection of the scenery of the Gorge and Great Falls of the Potomac River. Approximately 700 ha are zoned as natural areas.

Distinct administrative units protect significant natural resources and provide refuge for native species including at least 28 state-listed plant and animal species. Along the steep ravines bordering the Potomac River are possibly the best representations of mature second growth forest in the immediate D.C. area. Units with significant natural resources include:

- Arlington House – managed as a memorial to Robert E. Lee, contains a small mature oak forest that is maintained in pre-Civil War conditions.
- Dyke Marsh – covers approximately 150 ha of tidal marsh, floodplain, and swamp forest.
- Great Falls – the 300 ha park is covered by second growth deciduous forest.
- Theodore Roosevelt Island – 35 ha; this natural island is located in the Potomac River and is a tribute to Theodore Roosevelt. It was also mandated to be maintained as a natural area. Hiking trails pass through marsh, swamp, and upland forest communities.
- Turkey Run - contains over 280 ha of mostly deciduous forest and includes a well-developed floodplain forest that may be up to 180 m wide and extends for nearly 5 km along the Potomac River shore.

Exotic species are a concern in several natural areas including Dyke Marsh where porcelainberry (*Ampelopsis brevipedunculata*), Japanese honeysuckle (*Lanicera japonica*), and Asian bittersweet (*Celastus orbiculatus*) are spreading. Overabundance of white-tailed deer is a potential problem and may have significant impacts on natural vegetation within the parkway as well. Traffic associated with the parkway and development close to the park's boundaries also pose potential threats to the area's wildlife.

Park Resources and Species of Concern

Most Valuable Resources:

1. Great Falls of the Potomac and the Potomac Gorge
2. Dyke Marsh
3. Numerous Potomac River intakes
4. More than 15 perennial streams
5. Swamp forests
6. Upland forests
7. Seeps
8. Theodore Roosevelt Island

Species of concern have been identified and include species that are overabundant/invasive, as well as rare/threatened/endangered. At least 16 birds, 4 mammals, 3 herps, and more than 3 invertebrates have been identified as species of concern in the park. In addition, 38 plant species are listed S1-S3 in the 1999 National Capital Region Status Report. The park has identified 17 exotic species of special concern. Species of concern will be discussed in greater detail by workgroup(s) at a later date.

Threats and Resource Management Issues

Threats:

1. Contamination of tributary streams and the river
2. Sedimentation
3. Pipeline operations (sewer lines, etc.)
4. Exotic invasive species
5. Deer overbrowsing (potentially)
6. Overfishing
7. Residential/Commercial/Recreational development
8. Vehicles/speed and volume
9. Telecommunications towers

Threat Abatement:

1. Promote replanting of native vegetation to buffer streams from runoff
2. Promote local government adoption of stricter regulations for stormwater management and erosion control
3. Construct deer exclosures around sensitive resources
4. Use best management practices on parklands to reduce the spread of invasive plants.
5. Promote the use of less toxic road treatment materials, snow melters, etc.

Resource Management Issues: The overall goal of the park is to maintain the natural landscape.

Summary of Existing Monitoring Programs and Needs

Air: None in the park. Data from nearby stations is available.

Amphibian: Annual surveys conducted using Terrestrial Salamander Monitoring Program. Data will be submitted to the national program.

Birds: Breeding Bird Project conducted at Dyke Marsh since 1970's; annual CBCs cover Fort Hunt and Dyke Marsh; Breeding Bird counts conducted by Fairfax Audubon Society (FAS) at Great Falls since 1995; Duck survey conducted by volunteers at Boundary Channel since 1980s. None of the data has been analyzed; a graduate student is currently analyzing FAS data.

Fire: None

Fish: Jim Cummins has been monitoring Shad restoration efforts in the Potomac. No monitoring in the tributaries. Inventories have been done at CIA Run and are currently being conducted at Dyke Marsh.

Geology: None

Mammals: Deer Distance Sampling started in FY2001 and is planned twice a year in spring and fall.

Meteorology: None in the park; data is available from DC National Airport.

Pests: USDA surveys Gypsy Moths annually; more work is needed in the park. West Nile Virus is monitored by region.

Pesticides use: Pesticide logbook on file.

Reptiles: None

Soils: None

Sound: None

Vegetation:

Exotics - Invasive species are mapped and controlled by the Exotic Plant Management Team. Volunteers and the maintenance division implement additional control measures.

Visitors: None

Visual Landscape: None

Water Quality:

Surface water monitoring implemented in 2000 along 7 tributaries. Sampling is following standard protocol developed by Fairfax County.

Most Important Monitoring Needs:

1. Air quality monitoring (including ozone damage to plants)
2. Forest health monitoring (including Gypsy Moths (*limited), Dutch Elm disease, exotic species)
3. Rate of erosion at Dyke Marsh

*Indicates already implemented

Current Research Projects and Needs

Existing Research Projects: None

Research Needs:

1. Analyze erosion of Dyke Marsh by reviewing aerial photos.
2. Analyze 20 years of duck data and approximately 20 years of Breeding Bird Survey data collected at Dyke Marsh.

Partnering and Neighboring Agencies and Individuals

Partnering Agencies/Individuals:

1. Virginia Heritage
2. Fairfax County
3. Fairfax Audubon Society
4. Friends of Dyke Marsh

Neighboring Land Management Agencies:

1. Riverbend Park
2. Potomac Overlook Park
3. Gulf Branch Nature Center

Harpers Ferry National Historical Park

Overview

Harpers Ferry National Historical Park is located at the confluence of the Shenandoah and Potomac Rivers in West Virginia, Virginia, and Maryland. The 926 ha park is within the Blue Ridge physiographic province and contains forested mountains, riparian habitats, and floodplains that surround the park's historic town area.

Natural resource issues for Harpers Ferry NHP include impacts from external developments, adjacent landowners, and private and public land uses within the park. One hundred fifty-five exotic species have been identified in the park, and of these, 34 are considered to be invasive and a concern to the park because of their effects on native plants. The most obvious threats to vegetation have come from diseases or insect infestations on the park's eastern hemlock *(Tsuga canadensis*), butternut (*Juglans cinerea*), American elm (*Ulmus americana*) and oaks (*Quercus* spp.). The status of the native eastern dogwood (*Cornus florida*) is unknown but suspected to be affected by disease.

Park Resources and Species of Concern

Most Valuable Resources:

1. Eastern deciduous forest
2. Riparian habitat (about 10 miles fall within the park)
3. Wetlands (about 100 acres fall within the park)
4. John Brown Cave (4,000' long cave)
5. Exposed shale (predominates on the East side of the park)
6. Limestone (predominates on the West side of the park)
7. State listed rare plants
8. Native species
9. Historic Structures
10. Agricultural fields (Wheat, soybean, corn, and pasture)
11. Cultural and natural landscape

Species of concern have been identified and include species that are overabundant/invasive, as well as rare/threatened/endangered species. 15 species of concern for Harpers Ferry National Historic Park were identified in the following taxonomic categories: birds (6), mammals (1), and vegetation (8). This subject will be discussed in greater detail by workgroup(s) at a later date.

Threats and Resource Management Issues

Threats:
1. Floods
2. Drought
3. Gypsy Moths
4. White-tailed Deer (may be a threat but needs further documentation)
5. Canada Geese (overabundance perceived in the lower town area)
6. Invasive exotic plant species (Among 158 exotic species, 32 are considered invasive including bamboo, Japanese Honeysuckle, Japanese Stiltgrass, kudzu [minor problem])
7. Human impacts (railroads, trails, park services including: restoration of cultural resources and general maintenance)
8. Adjacent land development and construction impacts (towers, highways, utility rights of way)
9. Exotic forest pests (Gypsy Moths, Hemlock Wooly Adelgid, Dogwood Anthracnose)
10. Point and non-point source pollution to tributaries of the Potomac and Shenandoah River.

Threat Abatement:
Exotic plant management

Resource Management Issues:
1. Steep slopes must be monitored for rock movement and managed accordingly.
2. Exotic plants are spreading and need to be controlled and mapped.
3. Peregrine falcons are being restored through a multi-year release project.
4. Larger staff is needed to adequately address resource issues.
5. Gypsy Moth needs to be continual monitoring and controlling.
6. Cultural and natural resource management issues must continually be balanced.
7. Basic inventories need to be completed including John Brown Cave.
8. Boundary identification and marking is not complete.
9. Consistent soils data are needed among counties.
10. Sources of pollution to wetlands need to be identified.
11. Expand herbarium to document all of park flora.

Summary of Existing Monitoring Programs and Needs

Air: None

Amphibian: None

Birds: Raptors were monitored at a temporary banding station during the early 1990s.

Fire: Data collected and maintained by Ranger Division.

Fish: None

Geology: Building 45 and Jefferson rock monitored for rock movement.

Mammals: The park has set up 99 pellet plots to determine deer abundance. Vegetation plots and exclosures may be added to measure deer impacts.

Meteorology: Data collected and maintained by Ranger Division.

Pests: Hemlock Wooly Adelgid, Dogwood Anthracnose, West Nile Virus and Gypsy Moths (NPS and USDA).

Pesticides use: None

Reptiles: None

Soils: None

Sound: None

Vegetation: Rare plants (monitored by Native Plant Society and NPS), Exotics (mapped by NPS and EPMT but more work is needed).

Visitors: None

Visual Landscape: None

Water Quality:

Most Important Monitoring Needs:

1. Monitoring of adjacent land use and development via photo points or aerial photography
2. White-tailed Deer abundance and impacts on natural resources*
3. Gypsy moth management: annual monitoring*
4. Monitoring geologic resources*
5. Monitor water quality at selected sites*
6. Monitor insect pests, which are a problem to structures, museums, library, and archive
7. Rare plant monitoring*
8. Wetland monitoring

*Indicates that monitoring is already implemented

Current Research Projects and Needs

Existing Research Projects: None

Research Needs:

1. Evaluate impact of forest pest management operation and external pollution sources on moths, butterflies, damselflies, dragonflies, aquatic insects, and other fauna. (2) Identify major threats to rare fauna.

Partnering and Neighboring Agencies and Individuals

Partnering Agencies/Individuals:

1. Chesapeake and Ohio Canal National Historical Park
2. Appalachian Trail
3. FWS and US Customs Agency: HAFE manages 260 acres of the land owned by FWS and US Customs. This land is primarily leased to agriculture.

Neighboring Land Management Agencies:

Harpers Ferry Conservancy develops land easements and files lawsuits on behalf of environmental issues.

Manassas National Battlefield Summary

Overview

Manassas National Battlefield Park was established in 1940 to preserve the scene of two major Civil War battles that took place a few miles north of the prized railroad junction of Manassas, Virginia, in 1861 and 1862. The 2,064 ha park is located approximately 72 km southwest of Washington, D.C. within the Triassic basin of the northern Virginia Piedmont. The park is characterized by gently rolling hills with a patchwork of open fields and a successional range of oak-hickory forests with riparian vegetation along the streams.

Like other Civil War parks, Manassas NB has the unique challenge of combining the retention and re-creation of a historic landscape with natural resource management. Maintenance of the historical landscape, except in extreme cases, must take precedence due to the park's enabling legislation. However, this leaves flexibility for the management and preservation of the natural resources of the park and for the enjoyment of those resources by the public. Rare plants founds in the park include: Appalachian quillwort *(Isoetes appalachiana)*, marsh hedgenettle *(Stachys pilosa var. Arenicola*), blue-hearts *(Buchnera americana)*, hairy beardtongue *(Penstemon hirsutus)*, and buffalo clover *(Trifolium reflexum).* In addition, several rare community types are found in the park, including oak-hickory forest, eastern white pine forest, Piedmont/mountain swamp forest, and upland depression swamp.

Natural resource issues for Manassas include suburban sprawl, potential overpopulation of white-tailed deer and beaver (*Castor canadensis*), exotic species, and a shortage of natural resource staff.

Park Resources and Species of Concern

<u>Most Valuable Resources</u>:

1. Shrub/meadow habitat
2. Basic oak hickory forest
3. Eastern white pine forest
4. Piedmont swamp forest
5. Upland depression swamp

Species of concern have been identified and include species that are overabundant/invasive, as well as rare/threatened/endangered. 31 species of concern for Manassas National Battlefield were identified in the following taxonomic groups: birds (9), mammals (2), herps (2), invertebrates (4), vegetation (10) and vegetation

communities (4). In addition, the park harbors at least 37 exotic species of concern. This subject will be discussed in greater detail by workgroup(s) at a later date.

Threats and Resource Management Issues

Threats:
1. Exotic vegetation (Especially ailanthus, multiflora rose, Japanese honeysuckle, Japanese Stiltgrass).
2. White-tailed deer overabundance. The current population density estimate for fall 2000/spring2001 = 142.5 / sq. mile; 90% CI: 127.50-159.50/sq. mile.
3. Stream bank erosion along Young's Branch.
4. Development

Threat Abatement:
1. Shrub/Meadow restoration of approximately 300 acres.
3. 100-partially developed lot being restored including 15 acres of wetland.
3. Exotic plants are being mapped. Plans are underway to implement control measures of ailanthus and honeysuckle among others. Eradication of all exotic species will focus on rare communities.

Resource Management Issues: The overall goal of the park is to maintain the general landscape and viewshed as it was during the Civil War including natural and cultural resources.
1. Addressing development takes considerable staff time.
2. GMP is being developed and requires extensive planning.
4. Integrated Pest Management.
5. Controlling Exotic Species. Emphasis placed on most common including: Tree of heaven, Multiflora rose, Japanese honeysuckle, Japanese stiltgrass.

Summary of Existing Monitoring Programs and Needs

Air: None

Amphibian: None

Birds: There are various volunteer efforts: (1) Northern Virginia Breeding Bird Study (Contact: Carolyn Williams, Fairfax Audubon Society). Point counts conducted since 1996. (2) CBC count conducted every year. (Contact: Jack Dent). (3) Also, Kestrel nest boxes and barn owl platforms are inventoried by volunteer Mark Causey.

Fire: Chief of Visitor Protection is working on a fire management plan.

Fish: None

Geology: None

Mammals: Deer Distance Sampling started in FY2001 and is planned twice a year in spring and fall.

Meteorology: No data collected in the park but NOAA data is available for nearby Dulles Airport.

Pests: West Nile Virus and Gypsy Moths monitored as needed.

Pesticides use: Pesticide logbook on file.

Reptiles: None

Soils: None

Sound: None

Vegetation: Vegetation Plot Protocols were developed in 1997 for a vegetation monitoring study by CUE staff members to evaluate impacts from White-tailed Deer. Data from the vegetation monitoring project is on file and is in a database including GPS locations of all plots. In addition, 30 deer exclosures were set up in 2000 to monitor vegetation types. Exotics – have been mapped by Exotic Plant Management Team.

Visitors: Visitor counts made at the Visitor Center.

Visual Landscape: None

Water Quality:
A wetland restoration project (15 acres) will be monitored through a Smithsonian Institution mitigation effort. MANA is awaiting monitoring protocols.

Audubon Naturalist Society collects macroinvertebrate data along Young's Branch quarterly. Intermittent Hach Kit water chemistry testing completed. Data is on file.

Water Quality data inventory and analysis was completed in 1997. The report described 16 groups of parameters that exceeded the screening criteria within the park. MANA is continuing to monitor the sampling sites as time permits.

Most Important Monitoring Needs:
1. Vital Signs need to be identified
2. Exotic species and control efforts need to be monitored to identify Best Management Practices
3. White-tailed deer need to be monitored and data analyzed*. In addition, there is a need to evaluate deer impacts on potentially sensitive species such as ground nesting birds.
4. Water Quality Monitoring is needed. Current work is limited to volunteer efforts by the Audubon Naturalist Society. There is additional concern about runoff from new roads and development.

6. Species of concern need to be monitored including birds
7. Bird and Mammal Monitoring

*Indicates already implemented

Current Research Projects and Needs

Existing Research Projects: Deer exclosures set up to evaluate impacts of deer on native vegetation.

Research Needs: Evaluate impacts of deer on sensitive species.

Partnering and Neighboring Agencies and Individuals

Partnering Agencies/Individuals: None

Neighboring Land Management Agencies: Conway Robinson - Virginia State Forest

Monocacy National Battlefield Summary

Overview

Monocacy National Battlefield is located in central Maryland along the Monocacy River and is dominated by active farms with some second generation mixed hardwood forests and field/edge habitat. This park is managed as a cultural resource commemorating the Civil War battle that took place on July 9, 1864. Significant natural resources include three state endangered plants: Short's rockcress (*Arabis shortii*), dwarf larkspur (*Delphinium tricorne*), and harbinger-of-spring (*Erigenia bulbosa*) which have been located in the extreme southern section of the park.

Potential threats to the conservation of the park's natural resources include the release of airborne pollutants from industrial plants located southwest of the park and from heavy traffic on I-270, which bisects the park. Encroaching suburban sprawl makes the park an important preserve for wildlife and the spread of exotic plants has already been documented. An over-abundance of white-tailed deer may be altering the habitat in undesirable ways and needs to be evaluated.

Park Resources and Species of Concern

Most Valuable Resources:

1. The overall goal of the park is to maintain the general landscape as it was during the Civil War. Current crops grown include: corn, small grains (Wheat, winter wheat, & barley), soybeans, and alfalfa.
2. Forest habitat (Triangle Woods)
3. Riparian habitat
4. Open fields
5. Some small wetlands

Species of concern have been identified and include species that are overabundant/invasive, as well as rare/threatened/endangered. 18 species of concern for Monocacy National Battlefield were identified in the following taxonomic groups: birds (8), mammals (1), invertebrates (1), and plants (8). This subject will be discussed in greater detail by workgroup(s) at a later date.

Threats and Resource Management Issues

Threats:

1. Exotic plants (focus on ailanthus, multiflora rose, and honeysuckle)

2. White-tailed deer. The current population density estimate for fall 2000/spring 2001 = 192.15 / sq. mile; 90% CI: 138-265/sq. mile.
3. Encroaching housing development.
4. Agricultural runoff into the Monocacy River.
5. Water Pollution to Monocacy Creek
6. Eutrophication especially in Gambril Mill Pond.
7. Sound from highway I-270, which bisects the park.
8. Visitation to the park may grow rapidly in the future given rapid rate of development in surrounding areas.

Threat Abatement:
1. Easements to maintain agricultural setting.
2. General Management Plan is being developed
3. Exotic Plants. EPMT has inventoried most of the park for exotics. Control efforts have targeted Brooks hill. Target species include: ailanthus, multiflora rose, and honeysuckle.
4. MONO has a fire suppression plan
5. Restoration: Best farm has planted 20 acres of warm season grasses in September 2001.

Resource Management Issues:
1. Need more funding to get people into the field.
2. Need to maintain the cultural and natural landscape
3. White-tailed deer

Summary of Existing Monitoring Programs and Needs

Air: None

Amphibian: None

Birds: None

Fire: None

Fish: None

Geology: None

Mammals: Deer monitoring has been incorporated into the Antietam National Battlefield Deer Monitoring Program and includes distance sampling. Three deer exclosures have been established and are monitored by Dr. Bob Ford (Frederick Community College).

Meteorology: None

Pests: USDA monitors Gypsy Moths.

Pesticides use: Logbook is on file.

Reptiles: None

Soils: None

Sound: None

Vegetation: None

Water Quality: Stream Water – Volunteers may be monitoring chemistry at 11 sites within the park covering entrance and exit locations for stream flows.

Current Research Projects and Needs

Existing Research Projects: None

Research Needs: None

Most Important Monitoring Needs:
1. Deer population*
2. Exotic vegetation*
3. Species of concern especially monitoring for rare plants in Triangle Woods where deer abundance and poaching are perceived problems.
4. Water Quality monitoring was recommended by MD – Heritage program because found evidence of recent freshwater mussels living in the Monocacy River.

*Indicates already implemented

Partnering and Neighboring Agencies and Individuals

Partnering Agencies/Individuals:
Bob Ford (Frederick Community College) has collected fecal pellet counts at MONO.

Neighboring Land Management Agencies: None

National Capital Parks East Summary

Overview

National Capital Parks-East includes 12 major park areas covering 4,378 ha within the District of Columbia and three nearby counties in Maryland. The park lies entirely within the upper Coastal Plain physiographic region and is managed for a variety of natural, cultural, and recreational resources. Several administrative units provide significant natural resources including:

Anacostia Park – 227 ha river corridor park, with river access, recreational facilities, open space, restored tidal marshlands, and managed meadow habitat.

Fort Circle Parks (eastern section of the Civil War Defenses of Washington)– 409 ha; Forts Chaplin, Carroll, Davis, . Dupont, . Foote, . Mahan, . Stanton, and the Shepherd Parkway are managed for both their natural landscape and historical significance. Natural areas include extensive forested rigdgelines of deciduous hardwoods, forest seeps, and a 10 ha stand of loblolly pine (*Pinus taeda*).

Fort Washington – 140 ha; remains of several forts built between 1808 and 1902 highlight changing military tactics. Approximately 2/3 of the park consists of high quality deciduous forest.

Frederick Douglass National Historic Site – 3.4 ha; home of the important historical civil rights figure. The property also contains woodlands but is primarily managed for its cultural and historic significance.

Greenbelt Park/Baltimore-Washington Parkway – 475 ha; oak-hickory woodland provides nature study, outdoor recreational activities. The historic limited access scenic Parkway passes through deciduous forest, meadows, and maintained lawns.

Harmony Hall – 27 ha; on Broad Creek along the Potomac River and is largely wooded, with significant wetlands, waterfowl usage, as well as significant historic buildings..

The Kenilworth Park and Aquatic Gardens – 285 ha; the only National Park Service site devoted to the propagation and display of aquatic plants. Contains remnant tidal wetlands, swamp forest, and restored tidal marsh.

Oxon Cove Park and Oxon Hill Farm– 196 ha; farm representative of the early 20th century and demonstrates historic farming principles and techniques. The land area varies from low flat river shoreline to high river terraces with intermediate rolling hills created by a reclaimed sanitary landfill which existed on the site until the mid-1970s. Contains significant chestnut oak climax forest, and the meadow/shrub-scrub habitat and ponds of the old landfill have evolved into an important bird and wildlife area.

Oxon Run Parkway – 51 ha; an island sanctuary that is composed of deciduous forest and includes wetlands and floodplain areas. Includes several Magnolia bogs, NACE's rarest wetland community.

Piscataway Park – Stretches 9.7 km from Piscataway Creek to Marshall Hall (665 ha plus 1155 ha in easement); established in 1952 to preserve the river viewshed from Mount Vernon as it was in George Washington's days and Fort Washington. Extensive high quality forest and significant wetlands, shell-marl rvines communities, etc..

Suitland Parkway – 247 ha; the limited access scenic roadway passes through deciduous forest, meadows, and maintained lawns.

Significant communities in the park include rare upland communities such as the glauconite rich shell-marl ravine forest and the northern (McAteean) magnolia bog. The state rare grass-leaved arrowhead tidal community alliance is also found. At least 60 rare plants have been documented in the parks. Nesting bald eagles are found along the park's 50 km of shoreline.

Park Resources and Species of Concern

Most Valuable Resources:

1. Natural landscape including unique habitats in an urban setting
2. Viewshed
3. Eastern deciduous forest
4. Mixed deciduous pine forest
5. Tidal and non-tidal wetlands including restored wetlands
6. Seeps
7. Glauconite rich shell-marl ravine forest and associated plant community.
8. Sandy beaches--especially at Mockley Point and Fort Foote. Also, gravel shorelines (cobblestone size) which includes rare plant communities.
9. Magnolia bog at Oxon Run
10. Reptile and amphibian populations in many areas, including inner-city sites
11. Birds (including ground-nesting species within the city limits)

Species of concern have been identified and include species that are overabundant/invasive, as well as rare/threatened/endangered. 209 species of concern for National Capital Parks East were identified in the following taxonomic groups: birds (21), fish (2), mammals (3), herps (12), invertebrates (13), vegetation (153), and vegetation communities (5). This subject will be discussed in greater detail by workgroups at a later date.

Threats and Resource Management Issues

Threats:

1. Exotic plant invasion

2. Development on adjacent lands; also development pressure on park lands from DC
3. Abundant white-tailed deer
4. Feral Cats
5. Visitor impacts including illegal dumping; soil compaction
6. Sedimentation and urbanization of streams/erosion
7. Pollution

Threat Abatement:
1. Public outreach
2. Increased vigilance of surrounding development and border issues
3. Exotic Plant Management Team
4. Land easements (approximately 2/3 of Piscataway is protected through land easements).

Resource Management Issues:
1. Address NEPA compliance isssues
2. Interpreting of the natural resources (Protecting NR requires public understanding. Understanding comes from interpretation and education)
3. Building internal and external support for the natural resources in the parks
6. Development of General Management Plans for all park units
7. Preserving the overall integrity of the natural landscape

Summary of Existing Monitoring Programs and Needs

Air: None

Amphibian: Upland chorus frog monitoring protocol being developed by Dr. Robin Young (USGS).

Birds: Flyovers of nesting Bald Eagles conducted by USGS; bird and other observations made along transect at Kingman Lake by resource manager.

Fire: None

Fish: None

Geology: None

Mammals: Deer Distance Sampling started in FY2001 and is planned twice a year in spring and fall at Greenbelt and Piscataway. Fort Washington may be added.

Meteorology: Available at Reagan National Airport.

Pests: West Nile Virus monitored by region; and Gypsy Moths monitoring coordinated with CUE and USDA.

Pesticides use: Pesticide logbook on file.

Reptiles: None (except for Kingman Lake transect – see birds above)

Soils: None

Sound: None

Visitors: Data on visitor numbers may be available; visitor impacts are not monitored.

Vegetation:

Restoration – vegetation and seedbank plots monitored by USGS at Kingman Lake.

Permanent Plots - set up at Greenbelt Park but are not monitored.

Submerged Aquatic Vegetation - monitored by USGS.

Crops - farmers collect yield data.

Visual Landscape: None

Water Quality: There has been water quality monitoring at Kingman Lake and Kenilworth by USGS as part of restoration effort. The project is ongoing and annual reports are on file. In addition, there have been several other water quality evaluations in the park. The DC- COG has collected surface water quality at Fort Dupont. This one time evaluation may continue into the future. Also, WSSC has done water quality work in Piscataway in the 1970s. A report is on file. Groundwater was measured by USCE at Oxon Run prior to Metro construction; well sites are still in place but are not monitored. The Potomac and Anacostia Rivers fall under the jurisdiction of Maryland and District of Columbia.

Most Important Monitoring Needs:

1. Exotic Plants and their effect on native species and forest regeneration (*but more effort needed)
2. Development and boundaries (* but more effort needed)
3. Deer and their impacts on native species and forest regeneration (* but more effort needed)
4. Forest regeneration
5. Monitoring of species of concern
6. Monitoring of restored wetlands (* but more effort needed)
7. Shoreline change
8. Feral cats and their impacts on native wildlife
9. Monitoring of vegetation types and habitats
10. Monitor effects of hunting on waterfowl abundance in the park.

*Indicates already implemented

Current Research Projects and Needs

Existing Research Projects:
1. Effects of Organic and Inorganic Contaminants on Wildlife at Kingman Lake and Kenilworth Marsh--submitted in 1999. ----The project to evaluate toxic buildup in Barn Swallows has been implemented. A final report will be forthcoming upon completion.

Research Needs: None

Partnering and Neighboring Agencies and Individuals

Partnering Agencies/Individuals:
1. Anacostia Watershed Restoration Committee
2. USGS - BRD [has several Anacostia Project including monitoring Kingman Lake by Dick Hammerschlag]
3. USFWS
4. DC-COG has several water quality studies
5. Anacostia Toxic Alliance (EPA, FWS and others) works on toxicity projects in the Anacostia Watershed
6. MD – DNR works on hunting program along Piscataway Park shore
6. There are also several watchdog groups (Anacostia Watershed Society, Anacostia River Keeper, Sierra Club, Neighborhood Groups, Natural Resource Defense Council).

Neighboring Land Management Agencies:
Smallwood State Park

Prince William Forest Park

Overview

Prior to the 1700's, the area now covered by the 7,518 ha **Prince William Forest Park** was forested by deciduous trees. By the early part of the 20th century, much of that land had been farmed or mined. In 1936, an Executive Order was issued, establishing the Chopawamsic Recreation Demonstration Area, one of 46 recreation demonstration projects in 25 states. The Civilian Conservation Corps (CCC) constructed five cabin camps, numerous roads and lakes, and miles of trails to provide recreational opportunities.

Management of the recreation area was turned over to The National Park Service in 1940, and, in 1948, its name was changed to Prince William Forest Park. A significant mineral deposit of iron pyrite exists within the park boundary. This is the largest of its kind in Prince William County and one of the largest in the United States. The 30 square mile watershed of the Quantico Creek is almost entirely forested. The headwaters of South Fork Quantico Creek, 9 square miles, lie within Quantico Marine Corps Base, while 4 square miles of watershed are in private ownership. The remaining 17 square miles of the watershed lie within the park. Thus, the park has the unique opportunity to preserve and protect a large portion of this ecosystem. Because the park includes two physiographic provinces (Piedmont and Coastal Plain) and lies in the transition zone between northern and southern climates, it exhibits a wide range of habitat and vegetative communities. It is now the only natural area in the National Park System that contains a significant expanse of Piedmont Forest. The park contains several rare communities, including a seepage swamp and remote stands of eastern hemlock that contain old growth specimens, and two rare plants, the federally threatened small-whorled pogonia (*Isotria medeoloides*) and a state endangered sedge (*Carex vestita*). The star-nosed mole (*Condylura cristata*), although secure in its range, is considered rare in Virginia and is abundant in the park. The first documented observation of a timber rattlesnake (*Crotalus horridus horridus*) in Prince William County was recorded in the park in 1992. Subsequent sightings of the timber rattlesnake indicate that a relict population may exist in the park.

Summary of Existing Monitoring Programs

Most Valuable Resources:

1. Piedmont forest
2. Watershed
3. Open space

Species of concern have been identified and include species that are overabundant/invasive, as well as rare/threatened/endangered. 16 species of concern for Prince William Forest Park were identified in the following taxonomic groups: birds (5), mammals (2), herps (4), invertebrates (2), vegetation (1), and vegetation communities (2). This subject will be discussed in greater detail by workgroup(s) at a later date.

Threats and Resource Management Issues

Threats:
1. Outside development and encroachment
2. Overuse by park visitors
3. Sedimentation
4. Loss of habitat
5. Soil compaction

Threat Abatement:
1. Education
2. Working with partners such as Prince William County and Quantico
3. Easements
4. Exotic plant control
5. Pest control, such as gypsy moth
6. Boundary patrols by park rangers

Resource Management Issues:
1. Outside development
2. Site restoration
3. Education of the surrounding community through interpretation
4. Maintaining water quality
5. Balancing natural resources protection with recreation activities, and park development
6. Protecting human health and safety
7. Protecting resources from external development and overuse

Summary of Existing Monitoring Programs and Needs

Air: None

Amphibian: Anuran call surveys; visual encounter surveys; larval surveys.

Birds: Breeding Bird Survey conducted by volunteers and data is available online. The park has data from Migratory Bird Counts conducted in 1992, 1993, 1994, 1998, and 1999.

Fire: There is a draft fire management plan. There is a MS Access database with fire data. Fires have been mapped through 1998. There is also a report on the fire history of the park.

Fish: A post-reclamation water quality monitoring study includes fish and benthics data. The park has the Kelso draft report, which is a survey of fish and habitat.

Geology: None

Mammals: Deer distance sampling started in FY2001 and is planned twice a year in the spring and fall.

Meteorology: In 1999, an automated fire-weather station was established. It collects a variety of fire weather related data, including relative humidity, fuel moisture, wind speed and direction, precipitation, temperature. Law enforcement downloads the data. The park also obtains data from the weather station located on Quantico Marine Corps base, which is used in the Water Quality and Amphibian Monitoring programs.

Pests: The park responds to pest complaints such as termites, rodents, wasps, etc.. Gypsy moth egg mass surveys are done annually using 1/40-acre plots. The region monitors mosquitoes for the West Nile Virus.

Pesticides use: Monitoring of structures is done, and pesticide use is recorded. Logs are turned in every year.

Reptiles: There is an ongoing timber rattlesnake project in the park by a GMU graduate student (Terry Creque). There is no monitoring for reptiles other than noting wildlife through wildlife observation cards, which are used for visitors and staff.

Soils: None

Sound: There are problems with Quantico and I-95, but no monitoring is done.

Visitors: Visitor counters for cars are used. The visitor center maintains visitor statistics for cabins and campgrounds as well as for visitor contacts.

Vegetation:
Exotics - A binder that contains treatment forms and maps of the locations of exotic vegetation is maintained in the Resource Management office. RM staff worked with the EPMT this past year on numerous exotic vegetation removal projects. Prior to the EPMT, RM staff primarily worked in heavily infested and high use areas, treating approximately 1-5 acres per year. The EPMT is currently looking for and mapping additional locations of exotic species in the park.

Vegetation Plots - John Hadidian set up 50 20 x20 m plots throughout the park. The data folders were lost, and PRWI is currently trying to relocate these plots to start monitoring them again.

Rare plants - Annual surveys for *Isotria* are conducted by park staff. Loyal Merhoff conducted surveys for Isotria on potential exchange lands this past year, and Dr. Donna Ware will most likely be conducting surveys in the upcoming year on the lands affected by the construction of the new waterline.

Visual Landscape - The only established photo points in the park are at the Pyrite Mine Site. They were set up before the reclamation project in an effort to document the changes to the area as a result of the work that was performed.

Water Quality

- Macroinvertebrate data is collected at 34 points along Quantico Creek, South Fork and their tributaries. Fecal coliform data is collected from the 4 lakes weekly, and from 7 stream sites biweekly. Water chemistry data is collected once a summer from the 4 lakes and the 7 stream sites.
- The chemical parameters being measured are: sulfate, nitrate, nitrite, phosphate, lead, iron, aluminum, manganese, copper, and chlorine.
- The data collected under the current program goes back to 1995. Water quality data was collected before this point also. Fecal coliform data before 1995 was analyzed at CUE. Macroinvertebrate data was also collected.
- Resource Management staff collects and manages the data. It is all stored in a Microsoft Access database.

PRWI is not currently monitoring groundwater depth. Groundwater water quality has been monitored at the pyrite mine site, the greenwood mine, and the newly acquired Freeman Bradford property.

Most Important Monitoring Needs:

1. Air quality
2. Noise pollution
3. Exotic species*
4. Deer population and health *
5. Post-burn monitoring of wildfires
6. Gypsy moths *
7. Mosquitoes for West Nile Virus*
8. Cultural--pest management
9. T & E Species (small whorled pogonia)
10. Birds – migratory bird monitoring
11. Amphibian monitoring *
12. Surface water quality *
13. Ground water quality
14. Vegetation plots
15. Monitoring of headwater wells. (PRWI needs to have certain wells monitored prior to acquiring lands--as long as they still have legal recourse. Well testing will cost about $30,000. USGS may be able to fund some of the testing.)
16. Monitoring of Quantico Marine Base
17. Monitoring to predict fire danger, especially from Quantico

*Indicates already implemented

Current Research Projects and Research Needs

Existing Research Projects:

1. Survey of *Crotalus horridus* Population at Prince William Forest Park. Terry Creque, George Mason University.
2. Loudoun County Baseline Biological Monitoring Survey. John Galli, Metropolitan Washington Council of Governments.
3. Determine the Distribution of Mosquito Species Associated with West Nile Encephalitis and Survey Potential Breeding Habitat in NPS Units in the Northeast and National Capital Regions. Dr. Howard Ginsberg, URI.
4. National Park Service Bird Inventory - National Capital Region. Marcus Koenen, Center for Urban Ecology.
5. Sediment Survey of Quantico Creek and South Fork Quantico Creek. Michael Komelasky, George Mason University.
6. Fairfax County Stream Protection Strategy. Matt Handy, Fairfax County, Dept. of Public Works and Environmental Services.

Research Needs:

1. Map groundwater sinkholes, subsurface Karst resources
5. How can fire be used to manage exotic species?
6. Vegetation Surveys

Partnering and Neighboring Agencies and Individuals

Partnering Agencies/Individuals:
Quantico Marine Base
The town of Dumfries
Prince William County

Neighboring Land Management Agencies:
The park is bounded on the South by Quantico Marine Corps Base, Quantico National Cemetery, and Prince William County Park lands. A county park, Locust Shade, is located near the southeastern boundary of the park. There is also a county park, Hellwig, at Independent Hill. A golf course was added to Locust Shade and is located directly to the South of Prince William Forest Park.

Rock Creek National Park Summary
Overview

Rock Creek National Park was set aside by Congress in 1890 for the preservation "of all timber, animals, or curiosities... and their retention in their natural condition, as nearly as possible." Besides being one of the oldest parks in the National Park Service, Rock Creek is also one of the largest forested urban parks in the United States, containing a wide variety of natural, historical, and recreational features in the midst of Washington, D.C. The park also administers the Rock Creek and Potomac Parkway that connects this natural area to downtown, a series of historic sites from Civil War earthwork forts to colonial buildings, and landscaped areas in the District of Columbia. These areas total approximately 1100 ha.

The park surrounds the lower watershed of Rock Creek and its tributaries as the drainage drops from the piedmont plateau to the coastal plain. The largest contiguous section of the park contains 726 ha of natural forests along Rock Creek. The mixed deciduous forests, streams, and sensitive floodplain communities contain a variety of wildlife including 22 state or watch-listed plant species and 2 state-listed birds. The park also contains Washington's only endangered species, the Hay's Spring Amphipod, a crustacean found in selected freshwater springs.

Except for the narrow extension of parkland into Maryland that is under county administration, Rock Creek Park represents a largely isolated natural system surrounded by urban areas, which have impacted the park in significant and fundamental ways. These effects include flooding and pollution in park streams, introductions of invasive non-native species into natural areas, extirpations or reductions of sensitive native species, and the artificial inflation of a few native species' populations adversely that affect other native plants and wildlife.

Park Resources and Species of Concern

Most Valuable Resources:

1. Rock Creek and tributaries
2. Natural springs, vernal pools, and wetlands
3. Meadow habitat
4. Riverine flood plain
5. Upland deciduous forests
6. Herps
7. Neotropical Migrants

Species of concern have been identified and include species that are overabundant/invasive, as well as rare/threatened/endangered species. 77 species of concern for Rock Creek National Park were identified in the following taxonomic groups: birds (12), mammals (5), herps (11), invertebrates (4), vegetation (45), and vegetation communities (3). This subject will be discussed in greater detail by workgroups at a later date.

Threats and Resource Management Issues

Threats:

1. Exotics plant species
2. White-tailed deer overabundance. The current population density estimate for fall 2000/spring 2001 = 59 / sq. mile; 90% CI: 34.25-101.25/sq. mile.
3. Boundary (dumping, encroachment, development)
4. Sedimentation (driven by water quality, sewer issues)
5. Stream Bank Erosion (driven by water quantity)
6. Urban runoff, sediment control, water quality, leaky sewers, and combined sewer overflows (CSOs)
7. Springs and groundwater (water levels and quality)
8. Traffic (reducing wildlife populations)
9. Urban influence: illegal collecting, feral animals (e.g. cats), trash, development and loss of groundwater (The park is losing floodplain habitat because of the lowering of groundwater tables.)
10. Tree disease (Dutch Elm, Dogwood, Red Oak Decline)
11. Flood damage
12. Acid deposition
13. Loss of wildlife habitat

Threat Abatement

Treatment of exotic plants

Resource Management Issues:

1. Non-native plants
2. Management of rare, threatened, and endangered species
3. Shrinking habitats
4. Maintaining water quality
5. Overabundant deer
6. Traffic
7. Development along the borders and encroachment

Summary of Existing Monitoring Programs and Needs

Air: None

Amphibians: Partners in Parks volunteer program coordinated by Robin Jung—monitoring methods include coverboards and transects on waterways and tributaries. Northern section of park being inventoried. Dr. Jung also performs separate herp surveys that are part of the national Amphibian and Reptile Monitoring Initiative (ARMI).

Birds: Breeding Bird Census—data available since 1948; Christmas Bird Count--conducted annually since 1960s; raptors and waterfowl have been surveyed but monitoring program has not been established.

Fire: Fires are inspected when they occur and evaluated to determine cause. Ken Ferebee writes an incident report. Fire locations since 1997 are in the GIS database.

Fish: The D.C. government monitors the fish populations at three sites on the main stem of Rock Creek. DC also samples egg and larvae at the mouth of Rock Creek once a week during fish migration. The tributaries are monitored every other year to get a population estimate. DC also collects fish tissue samples for toxicity analysis of the Potomac and Anacostia. Three-four sites north of Pierce Mill will be monitored monthly for all species during anadromous fish spawning season.

Geology: None

Mammals: Deer distance sampling implemented in 2000 as part of a regional monitoring program; Spotlight deer counts have been for the last six years by park personnel; in 2000, 40 paired deer exclosure plots were set up--20 exclosures and 20 control plots. Beaver monitoring protocols were set up in 1980. The population survey is repeated every 8-10 years.

Meteorology: There is a weather station with a thermometer and a rain gauge at the visitor center. Data is usually submitted to NOAA or D.C.

Pests: Gypsy moth egg masses are monitored every year. There are 200 plots (1/40 acre plot) set up on a grid system, including the tributary parks. 57 are read each year in oak forest habitats.

Pesticide use: Pesticide logbook is on file.

Reptiles: No monitoring of reptiles is being done. A mark and recapture study of box turtles was implemented in 2001.

Soils: None

Sound: Carter Barron monitors sound emanating from theatre to meet local regulations. There are no other monitoring stations.

Vegetation: There are 20 plots set up to monitor the invasive non-native plant mitigation program. Ten of these plots are control and ten are treatment. This is follow-up to a 3-year research program initially conducted 1996-1998.

There are 27 long-term vegetation plots set up to monitor trees, soils, herbaceous layer, etc. So far they have been done every 4 years, 1991, 1995, 1999, and one is planned for 2003.

Visitors: Permanent traffic counters are set up; data is compiled by WASO in Denver. Also, the interpretation program maintains numbers of visitors using the visitor center, guided talks, horse rides, etc. Visitor impacts are not monitored.

Visual Landscape: No photo points

Water Quality: DC has fixed station monitoring (two stations read once a month; metals are measured quarterly). The tributaries are measured for fecal coliform and metals quarterly. A hydro lab measures temperatures, dissolved oxygen, pH, conductivity monthly at the fixed stations and quarterly on the tributaries. Macroinvertebrates are sampled every other year at two spots. Also the Audubon Naturalist Society volunteers program samples macroinvertebrates quarterly on three tributaries.

The U.S. Geological Survey's gauging station at Sherrill Drive is still running to collect flow data.

There is currently intermittent long-term monitoring of periodic flow at West Spring.

Regular annual inspections are performed for stream channels, sanitary sewer stream crossing, trails, and boundaries of the park.

Most Important Monitoring Needs:

1. Deer impact-- monitor sensitive plants and vegetative impacts more frequently
2. Herps--monitor population status and threats annually
3. Rare plants/animals -- monitor status and threats of known listed species. (macro invertebrates, though they don't know how they can do this)
4. Springs -- monitor flow and water quality testing at multiple sites 2-4 times annually
5. Exotics -- monitor degree of infestation; monitor degree of regrowth in treatment areas; monitor regeneration of native species on treated sites; monitor residual effect of herbicides.

5b. Boundaries and encroachment

5c. Monitoring of flow and water quality during dry weather at 275 storm water outfalls and 49 combined sewer outfalls draining into the park.

6. Urban runoff, sediment control
7. Anadromous fish -- after stream barrier mitigation
8. Tree Disease – monitor status of Dutch Elm Disease and Dogwood Anthracnose
9. Roadkills – more systematic sampling needed
10. Moths and Butterflies – monitor species and numbers in natural area

11. Flow/water quality – continuous monitoring at fixed station on Rock Creek.
12. Water quality - monitor several water quality parameters on the tributaries
13. Fish numbers and diversity – monitor Rock Creek and tributaries every 2-3 years.
14. Macroinvertebrate numbers and species diversity – increase monitoring sites on Rock Creek and include 14 tributaries.
15. Trails – monitor erosion rates and repair/stabilize
16. Picnic Areas – monitor soil compaction, erosion, and tree health at 30 sites each 2 years.
17. Property Encroachments – monitor forest regeneration at 100+ sites along the park boundary.
18. Air quality – biological monitoring of numbers, locations and health of plant species sensitive to air quality.
19. Long-term meadow monitoring
20. Ground water levels and quality--rare spring invertebrates

Current Research Projects and Needs

Existing Research Projects:
Ongoing project evaluates control measures (glyphosate) for *Ranunculus*.

Research Needs:
1. Survey for bobcat, coyote, gray fox, flying squirrel, and opossum. Gray fox and opossum may be declining, and flying squirrel may be scarce.
2. Vegetation impact of deer

Partnering and Neighboring Agencies and Individuals

Partnering Agencies/Individuals
1. DC -- water quality monitoring/fish monitoring
2. Audubon Naturalist Society -- Christmas Bird Count, Breeding Bird Census, volunteer stream monitoring
3. Volunteers who work on exotic species control
4. Maryland Native Plant Society – monitor rare plants
5. USGS – monitor flow of Rock Creek
6. Partners in Parks – inventory and monitoring of herps.

Neighboring Land Management Agencies:
District of Columbia

Wolf Trap Farm Park

Overview

Wolf Trap Farm Park encompasses 53 ha of rolling hills and woods originally donated to the National Park Service by Catherine Filene Shouse to be used exclusively for the performing arts. It is now the only National Park dedicated to the performing arts, and its largest venue seats over 7,000 people.

Wolf Trap Farm Park lies entirely within the Piedmont Province. Within the boundaries of the park are streams, meadows and heavily wooded areas.

Park Resources and Species of Concern

Most Valuable Resources:

1. Forest patches in the midst of development
2. Streams including Court House Branch and Wolf Trap Run.
3. Riparian Forest along Court House Branch and Wolf Trap Run.

Species of concern have been identified and include species that are overabundant/invasive, as well as rare/threatened/endangered species. 6 species of concern for Wolf Trap Farm Park were identified in the following taxonomic groups: birds (2), mammals (1), invertebrates (1), vegetation (1), and vegetation communities (1). The subject will be discussed in greater detail by workgroups at a later date.

Threats and Resource Management Issues

Threats:

1. Water Quality is a major concern. Fecal coliforms have been measured in Wolf Trap Creek and pose a public health issue. Swimming is no longer allowed in the creek. Also, Old Court House Branch contained zero macroinvertebrates in 2000 surveys (more recent surveys documented some macros, however).
2. Stream bank erosion has occurred due to increased development around the park. The erosion may threaten the maintenance yard in the future. This has lead to sediment deposition.
3. Runoff from the Dulles Toll Road may have detrimental effects
4. Streams threatened by fertilizer runoff from the Park's management is a concern. There may be other related issues such as parking lot run-off.
5. Exotic species coming into the park from neighbors, but the park has also planted exotics in the past

6. Deer may be causing a browsing problem but this has not been monitored
7. Salt storage in maintenance yard is a concern (runoff to stream)
8. Encroachment onto the park boundaries is some concern – neighbors dump grass clippings, etc. onto the property and develop informal trails
9. Noise from the Dulles Toll Road is a problem

Threat Abatement:
1. Resource Management has been communicating with McLean Bible Church about soil erosion and associated sedimentation problems
2. Homeowners Association keeps some areas out of development
3. Stream bank stabilization has occurred near the east parking lot to prevent further encroachment upon the park's road
4. Scenic Easements exist on the eastside of Trap Road

Resource Management Issues:
1. Visitor Impacts - Maintaining grass parking lots is a huge effort. It is difficult due to the nightly parking needs during the summer concert series.

Summary of Existing Monitoring Programs and Needs

Air: None

Amphibians: None

Birds: Eastern Bluebird only (volunteer – data is not available)

Fire: None

Fish: None

Geology: None

Mammals: None

Meteorology: None

Pests: West Nile Virus, Gypsy Moth

Pesticides use: None

Reptiles: None

Soils: None

Sound: None

Vegetation: Exotic plant species are being mapped by EPMT.

Visitors: None

Visual Landscape: None

Water Quality: (1) Surface waters monitored by NPS (focus on macroinverebrates and pesticides). (2) Monitoring also by Northern Va. Soil & Water Conservation District which follows the Izaak Walton League protocol (contact Joanna Arciszewski at Joanna.Arciszewski@co.fairfax.va.us). (3) Audubon Naturalist Society conducting independent Water Quality monitoring (Contact Cliff Fairweather).

Most Important Monitoring Needs:
1. Water Quality needs continued monitoring.
2. Exotic Plants (*limited)
3. Deer browse to monitor deer impact.

*Indicates already implemented

Current Research Projects and Needs

Existing Research Projects: None

Research Needs: None

Partnering and Neighboring Agencies and Individuals

Partnering Agencies/Individuals: None

Neighboring Land Managers:
Homeowner Associations including:
Cinnamon Woods HA (west)
Shouse Village HA (north)
Wolf Trap/Wolf Den HA (north and west)